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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/770,931	02/03/2004	Paul Tinwell	FMO P-3855-1	1664

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EXAMINER

HODGES, MATTHEW P

ART UNIT	PAPER NUMBER
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2879

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/30/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/770,931

Applicant(s)

TINWELL, PAUL

Examiner

Matt P. Hodges

Art Unit

2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 October 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 30-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 30-45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application
- ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 30, 31, 35-38, 42, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. (US 6,265,816) in view of Yamaguchi et al. (US 4,700,103).

Regarding claims 30 and 37, Ito discloses (see figure 1) a spark plug including a threaded shell (1) with an axial bore, an insulator (2) located partially inside the shell axial bore, a center electrode (3) located inside the insulator, and a ground electrode (4) connected to the shell. The center electrode includes a main shank portion located inside the insulator bore (D₆) and a first radially reduced portion located inside the insulator bore (D₇). Both portions are generally located at a lower axial end of the spark plug, where it is assumed that lower relates to the portion of the plug creating a spark. The sizes of the two portions are determined by the insulating bore and are between 2-5mm and 1-3.5mm respectively. (Column 11 lines 25-31). Further the diameter of the shell threading is either 12 or 14mm. (Column 12 lines 5-10). Ito further discloses (see figure 3) a radially reduced portion on which a noble metal tip is attached. Ito does not appear to specify the use of a recess portion to attach the noble metal tip to the center electrode, however Yamaguchi, in the same field of endeavor, discloses (see figures 5a-5b) the use of a recess formed in the center electrode in order to mechanically attach a metal tip partially inside the center electrode. The use of a recessed tip advantageously reduces thermal

Art Unit: 2879

stress and improves durability. (Column 2 lines 35-40). Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the use of a recess portion to attach the noble metal tip to the center electrode as taught by Yamaguchi into the device as disclosed by Ito in order to advantageously reduce thermal stress and improve durability.

Regarding claims 31 and 38, Ito further discloses the use of an Ir alloy noble metal tip. (Column 9 lines 5-11).

Regarding claims 35 and 42, Ito further discloses the use of a flat noble metal pad opposite the noble metal tip and formed on the ground electrode to form a sparking surface. (See figure 3 and Column 12 lines 15-20).

Regarding claims 36 and 43, Ito in view of Yamaguchi discloses the device as claimed (see rejections of claims 30 and 37 above) but does not appear to specify the gap spacing between the noble tip and noble pad. However it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In this instance, the gap spacing of a spark plug is determined primarily by the general shape of the firing tip and ground electrode along with the voltage of the operating device. The shape of the tip and pad are defined and disclosed as claimed, while the voltage of the driving device is determined by the intended use of the device. Thus for these known variables, the optimum gap distance is a result effective variable that is bounded by an upper range where a spark cannot readily be maintained and a lower range where a spark may be inadvertent. Identifying the ideal values inside this range would only require routine experimentation by one having ordinary skill in the art. Thus, it would have been obvious to one of ordinary skills in the art at the time the invention was made

Art Unit: 2879

to select a gap spacing of between 0.5mm and 1.75mm, since discovering an optimum value of a result variable is considered within the skills of the art.

Claims 32-34, 39-41, 44 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. (US 6,265,816) in view of Yamaguchi et al. (US 4,700,103) and further in view of Osamura et al. (US 6,262,522).

Regarding claims 32 and 39, Ito in view of Yamaguchi discloses the device as claimed (see rejections of claim 31 and 38 above) but does not appear to specify the use of between 1 and 20% Rh in the Iridium tip. However Osamura, in the same field of endeavor, discloses (see figure 2) the use of a Ir-Rh metal tip where Rh is included in an amount of 3%. (See Table 1). The use of Rh in the prescribed amount advantageously improves heat resistance and consumption resistance at high temperatures and thus improves device reliability and lifespan. (Column 1 lines 57-67). Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the use of between 1 and 20% Rh in the Iridium tip as taught by Osamura into the device as disclosed by Ito in view of Yamaguchi in order to advantageously improve device reliability and lifespan.

Regarding claims 33, 34, 40 and 41, Ito in view of Yamaguchi discloses the device as claimed (see rejections of claim 30 and 37 above) but does not appear to specify the dimensions of the noble metal tip. However Osamura, in the same field of endeavor, discloses (see figure 2) the use of a noble metal tip with a diameter between 0.5mm and 2.0mm and a length between 0.3mm and 2.5mm. (Column 2 lines 49-51). The use the prescribed dimensions advantageously improves consumption resistance, ignitability, welding stability, and durability. (Column 4 lines

Art Unit: 2879

7-25). Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the use of a noble metal tip with a diameter between 0.5mm and 2.0mm and a length between 0.3mm and 2.5mm as taught by Osamura into the device as disclosed by Ito in view of Yamaguchi in order to advantageously improve consumption resistance, ignitability, welding stability, and durability.

Regarding claims 44 and 45, the device as disclosed by Ito in view of Yamaguchi and further in view of Osamura teaches a collar portion that tapers down from the first radially reduced portion but has a larger diameter than the noble metal tip. As disclosed above, the first radially reduced portion is sized between 1-3.5mm while the noble metal tip is sized between 0.5mm and 2.0mm. Thus the collar portion has dimensions inside the claimed ranges of 0.75mm to 1.75mm.

Response to Arguments

Applicant's arguments filed 10/30/2006 have been fully considered but they are not persuasive.

Regarding applicant's assertion that the bore dimensions do not accurately describe the dimensions of the interior elements, the examiner respectfully disagrees. The diagrams and specification clearly indicate the use of filling the respective bores with the internal element. In that regard the bore dimensions are substantially indicative of the elements directly inside of their surfaces.

Regarding applicant's assertion that the main electrode does not extend into the bore (D₆), the examiner respectfully disagrees. It is evident in figure 1, that at least a portion of the

Art Unit: 2879

metal electrode extends into the portion and expands to fill the bore at that location. That the remainder of the bore is filled with other components does not negate the portion that is filled with the metal electrode.

Regarding applicant's assertion that the ranges of the tip diameter do not include the specificity to meet the claimed ranges, the examiner respectfully disagrees. When considering a reference that discloses a broader claimed range it is assumed that the reference discloses all values within that range unless it can be distinguished that it was either not anticipated to use such a subset as claimed or the scope of the claimed ranges is dramatically different from the disclosed ranges. In this regard, the examiner does not feel that the difference in scope of the claimed and disclosed ranges is that substantial to believe that the ranges were not anticipated by the prior art. Further, there is no evidence of record that either the narrow ranges lead to any unexpected results from the prior art or that one of ordinary skill in the art would not arrive at the claimed ranges when applying the invention of the prior art to the disclosed device through routine experimentation.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period

Art Unit: 2879

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

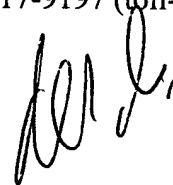
Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matt P Hodges whose telephone number is (571) 272-2454. The examiner can normally be reached on 7:30 AM to 4:00 PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (571) 272-2457. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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